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PN -JP9153315 A 19970610
 TI -COMPOSITE INSULATING TUBE AND MANUFACTURE OF COMPOSITE INSULATING TUBE
 FI -H01B17/26&D ; H01B17/38 ; H01B19/00&301
 PA -NGK INSULATORS LTD
 IN -NAKAYAMA TETSUYA; UCHIUMI YUSUKE
 AP -JP19950312270 19951130
 PR -JP19950312270 19951130
 DT -I

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AN -1997-361040 [33]
 TI -Compound Insulator-tube equipped with flange fitting - Insulates air-cored cylinder and surrounding casing by maintaining insulation oil at attachment junction of flange fitting
 AB -J09153315 The insulated-tube has a main body³⁾ which comprises an air-cored cylinder (1) provided inside a casing²⁾. The combination of casing and core cylinder fits into a flange fitting⁴⁾ provided with a bolt hole (6) at the bottom. The flange fitting forms an attachment junction between the core and casing end pairs.
 -An annular projection (5) is provided on the outer surface of the casing. The radial annular projection holds the casing to the flange fitting. The space between the annular projections and the flange fitting is sealed by an insulation oil. The attachment junction is made watertight by the sealing insulation oil.
 -ADVANTAGE - Maintains good insulation. Provides endurance. Prevents encroachment of water to inside from outside.
 -(Dwg.3/4)
 IW -COMPOUND INSULATE TUBE EQUIP FLANGE FIT INSULATE AIR CORE CYLINDER SURROUND CASING MAINTAIN INSULATE OIL ATTACH JUNCTION FLANGE FIT
 AW -LIGHTNING CONDUCTOR ELEMENT
 PN -JP9153315 A 19970610 DW199733 H01B17/38 005pp
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TI -COMPOSITE INSULATING TUBE AND MANUFACTURE OF COMPOSITE INSULATING TUBE

AB -PROBLEM TO BE SOLVED: To prevent infiltration of water such as rain water from the exterior to the interior and to prevent leakage of pressurized gas or oil and infiltration of moisture of the outside air between the interior and the exterior of a composite insulating tube.

-SOLUTION: This composite insulating tube comprising a hollow core cylinder, an outer covering² provided on an outer circumference of the core cylinder, and a metallic seal part attached to an end part of the core cylinder and adhesively jointed to an outer circumferential surface of the core tube end part and to an end part of the outer covering, wherein projections³ projecting radially outward is provided on an outer surface of the end part of the outer covering to which the metallic seal part is jointed, and the adhesively jointed part of the metallic seal part with the outer circumferential surface of the core tube has sealing property against gas and insulation oil while the adhesively jointed part of the metallic seal part with the end part of the outer covering² has watertightness.

I -H01B17/38 ;H01B17/26 ;H01B19/00

PA -NGK INSULATORS LTD

IN -NAKAYAMA TETSUYA; UCHIUMI YUSUKE

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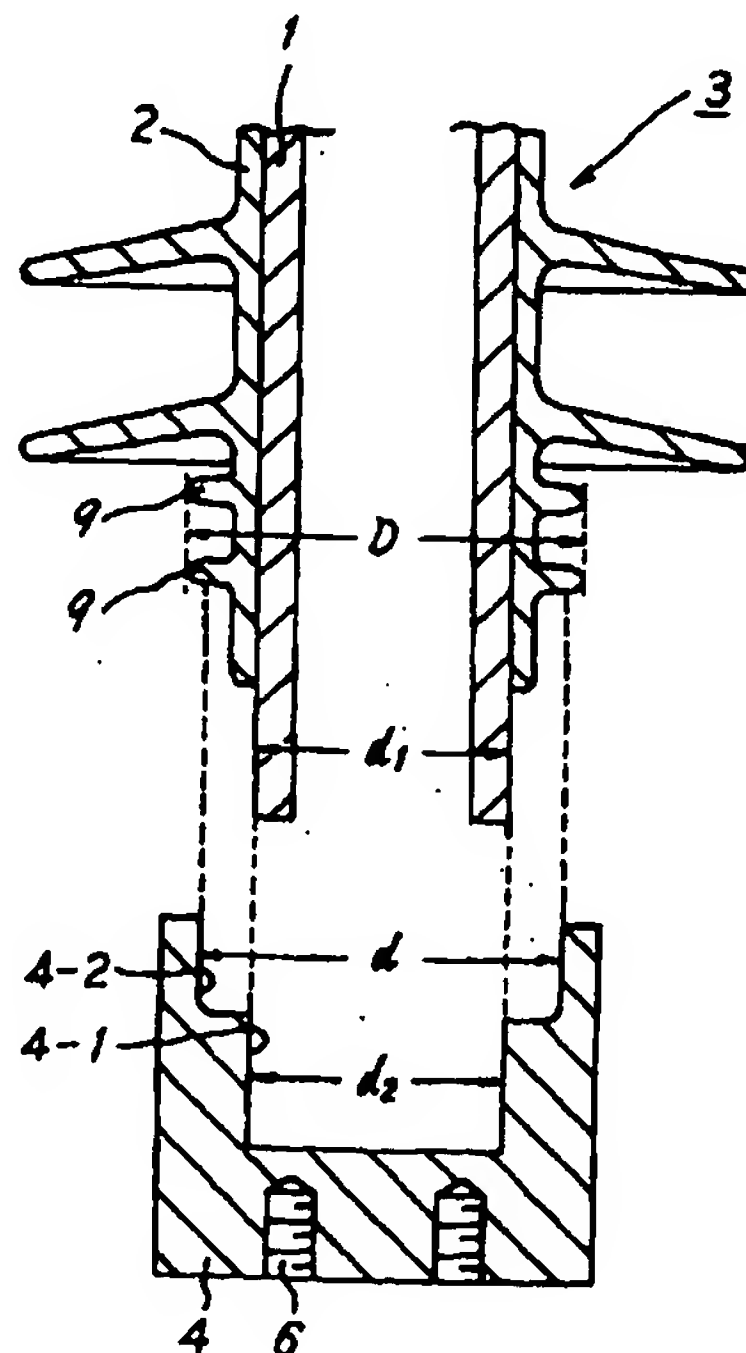
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(54) 【発明の名称】 複合導管及び複合導管の製造方法

(57) 【要約】

【課題】外部からの内部への雨水等の水が侵入することを防止するとともに、複合磚管内外間で加圧ガスや油が漏洩外気の水分が侵入することを防止することが可能であり、かつ外被と芯筒をあらかじめ一体成形しておき、これをフランジ金具と接着・接合するタイプの複合磚管及び同複合磚管の製造方法を提供するものである。

【解決手段】中空の芯筒と、芯筒の外周に設けた外被と、芯筒の端部に取り付けられ芯筒端部の外周面及び外被の端部に接着・接合したシール金具とからなり、シール金具を接合する外被端部の外表面に半径方向外側に突き出た突起が設けられており、シール金具と芯筒の外周面との接着・接合部はガス・絶縁油に対しシール性を有し、シール金具と外被の端部との接着・接合部は水密性を有する複合導管。



【特許請求の範囲】

【請求項1】中空の芯筒と、芯筒の外周に設けた外被と、芯筒の端部に取り付けられ芯筒端部の外周面及び外被の端部に接着・接合したシール金具とからなり、シール金具を接合する外被端部の外表面に半径方向外側に突き出た突起が設けられており、シール金具と芯筒の外周面との接着・接合部はガス・絶縁油に対しシール性を有し、シール金具と外被の端部との接着・接合部は水密性を有する複合導管。

【請求項2】前記突起が外被端部に接着・接合されるシール金具の対向面まで実質的に延びていることを特徴とする請求項1記載の複合導管。

【請求項3】前記突起がシール金具を接着・接合する外被端部の外表面に軸方向に離間させて半径方向外側に突き出た少なくとも2個の突起であることを特徴とする請求項1または2に記載の複合導管。

【請求項4】中空の芯筒と、芯筒の外周に設けた外被と、芯筒の端部に取り付けられ芯筒端部の外周面及び外被の端部に接着・接合したシール金具とからなりシール金具と芯筒の外周面との接着・接合部はガス・絶縁油に対しシール性を有し、シール金具と外被の端部との接着・接合部は水密性を有する複合導管の製造方法であって、以下の特徴を有する複合導管の製造方法。

(1) 芯筒の外周の回りに外被を形成し、シール金具を接合する外被の外表面に半径方向外側に突き出た突起を設け、突起の基端部を水密性を確保するためのRTV（低温加硫シリコンゴム）の保持部として用いる。

(2) 少なくとも外被の該RTV保持部にRTVを塗布し、芯筒端部の外周面及びシール金具の芯筒の挿入穴の少なくとも一方にシール性を与え接合するための樹脂を塗布する。

(3) 工程(2)に引き続き、外被端部及び芯筒端部をシール金具の挿入穴に挿入して、該RTVおよび該樹脂を硬化させる。

【請求項5】芯筒の端面及び芯筒端部の外周面及び外皮端部にシール金具を取り付ける前の状態で、 $D > d$ 及び $d_1 - d_2 \leq 0$ (D は、該突起をの外径であり、 d はシール金具の外被端部の挿入穴の径であり、 d_1 は芯筒の端部の外径であり、 d_2 はシール金具の芯筒の挿入穴の径である)としたことを特徴とする請求項4記載の複合導管の製造方法。

【請求項6】前記突起がシール金具を接着・接合する外被端部の外表面に軸方向に離間させて半径方向外側に突き出た少なくとも2個の突起であることを特徴とする請求項4または5に記載の複合導管。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、複合導管に関するものである。ここに「導管」とは、ブッシング本体部分に用いられるあるいは避雷素子などの要素を収納するた

めの絶縁部材であって、軸方向内部に導体を通すあるいは要素を収納するための貫通孔を有するものをいい、ブッシングとは、壁又は導体を通す場合に隔壁から導体を絶縁し支持する装置をいう。また、「複合導管」とは中空の芯筒と、その外周部に設けられた絶縁高分子材料からなるハウジングと、フランジ金具とからなる導管をいう。

【0002】

【従来の技術】従来、図1に示すようなフランジ金具を備えた複合導管が知られている。すなわち、この複合導管では、端部に肉厚部1aを有する中空芯筒1の外周面の回りに外被2を形成した複合導管本体3の端部をフランジ金具4に形成した環状溝4bに挿入し、図中5にて示す位置にて外被端部の外周面とフランジ金具の対向する内周面との間を水密に低温加硫シリコンゴム（以下“RTV”とする）で接着するとともに、該接着部の軸方向外方のフランジ金具の部分4aを外周から縮径して芯筒の回りにかしめることによって、中空芯筒1の外周面に外被2を形成した複合導管本体3の端部にフランジ金具を取り付けていた。図中6は、フランジを他の部材に取り付けるボルト穴である。

【0003】

【発明の解決しようとする課題】上記複合導管の場合、複合導管の内外の水密性は外被端部の外周面とフランジ金具の対向する内周面との間のRTVによる接着・接合部で確保されているが、かしめ部は単に相互の部材が接しているだけであるため、この部分に気密性を求めることはできなかった。このため、上記複合導管をアレスターの収納容器として用いる場合（図2参照）、内部要素と中空芯筒間の空間にRTVのような充填後硬化させた弾性絶縁体を充填させていた。このような使用法により気密性が実用上支障とならなかった。

【0004】しかしながら、図1に示す複合導管の内部に加圧ガスや絶縁油を封入するにあいには、外部からの水の侵入は外被端部の外周面とフランジ金具の対向する内周面との間を水密に接着するRTV層で防止することができるが、かかるRTV層では加圧ガスや絶縁油の漏洩を十分に防止できなかった。本発明は、外部からの内部への雨水等の水が侵入することを防止するとともに、複合導管内外間で加圧ガスや油が漏洩あるいは外気の水が侵入することを防止することが可能な複合導管及び同複合導管の製造方法を提供するものである。

【0005】

【課題を解決するための手段】本発明の複合導管は、中空の芯筒と、芯筒の外周に設けた外被と、芯筒の端部に取り付けられ芯筒端部の外周面及び外被の端部に接着・接合したシール金具とからなり、シール金具を接合する外被端部の外表面に半径方向外側に突き出た突起が設けられており、シール金具と芯筒の外周面との接着・接合部はガス・絶縁油に対しシール性を有し、シール金具と

外被の端部との接着・接合部は水密性を有することを特徴とする。

【0006】本発明の複合導管の製造方法は、中空の芯筒と、芯筒の外周に設けた外被と、芯筒の端部に取り付けられ芯筒端部の外周面及び外被の端部に接着・接合したシール金具とからなりシール金具と芯筒の外周面との接着・接合部はガス・絶縁油に対しシール性を有し、シール金具と外被の端部との接着・接合部は水密性を有する複合導管の製造方法であって、以下の特徴を有する。

【0007】(1) 芯筒の外周の回りに外被を形成し、シール金具を接着・接合する外被の外表面に半径方向外側に突き出た突起を設け、該突起の基端部を水密性を確保するための保持部として用いる。

(2) 少なくとも外被の該樹脂保持部にRTV（低温加硫シリコンゴム）を塗布し、芯筒端部の外周面及びシール金具の芯筒の挿入穴の少なくとも一方に樹脂を塗布する。

(3) 工程(2)に引き続き、外被端部及び芯筒端部をシール金具の挿入穴に挿入して、該RTVおよび樹脂を硬化させる。

【0008】本発明の複合導管及び同複合導管は製造方法は、中空の芯筒と、芯筒の外周に設けた外被と、芯筒の端部に取り付けられ芯筒端部の外周面及び外被の端部に接着・接合したシール金具とからなりシール金具と芯筒の外周面との接着・接合部にガス・絶縁油に対しシール性を持たし、シール金具と外被の端部との接着・接合部に水密性を持たせることができるので、複合導管に対し水密性及び加圧ガス及び絶縁油へのシール性を発揮させることができる。

【0009】

【発明の実施の形態】本発明の複合導管及び同複合導管の製造方法を以下に述べる。本発明の複合導管は、前記突起が外被端部に接着・接合されるシール金具の対向面まで実質的に延びていることが好ましい。ここに「実質的に延びる」とは、突起の端部が外被端部に接着・接合されるシール金具の対向面に接触している場合や、突起の端部が外被端部に接着・接合されるシール金具の対向面のごく近傍まで延びる場合を意味する。この場合には、複合導管を製造する際、外被端部とシール金具との接着・接合に必要な量のRTV量を突起の基端部に形成される樹脂保持部及びその近傍に確実に保持できるので、複合導管の外被端部とシール金具との接合・接着がより強固となる。また、シール金具には、芯筒の端部を挿入する穴部及び外被の端部を挿入する穴部からなる2段の挿入穴を設けることが好ましく、この際、芯筒の端部を芯筒端部挿入穴部の底部に密着させることが好ましい。

【0010】本発明の複合導管は、概略以下のようにして製造することができる。芯筒の外周の回りに外被を形成するが、外被の形成には、インジェクション成形法、

トランスファ成形法あるいはコンプレッション成形法の従来の方法を用いることができる。基端部をRTVの保持部として用いる半径方向外側に突き出た突起は、上記成形工程中一体に形成できる。また、シール金具を接着・接合する外被の外表面に軸方向に離間させ半径方向外側に突き出た少なくとも2個の突起についても上記外被の形成と同時に形成することができる。この際、該少なくとも2個の隣接する突起の間にRTV保持部が形成される。

10 【0011】芯筒の端面及び芯筒端部の外周面及び外皮端部にシール金具を取り付ける前の状態で、 $D > d$ 及び $d_1 - d_2 \leq 0$ とすることが好ましい。ここに、 D は、該突起をの外径であり、 d はシール金具の外被端部の挿入穴の径であり、 d_1 は芯筒の端部の外径であり、 d_2 はシール金具の芯筒端部の挿入穴の径である。前述のように、このようにすることによって、シール金具との接着・接合に必要なRTV量を突起間に形成されるRTV保持部及びその近傍に確実に保持できるので、複合導管の外被端部とシール金具との接合・接着がより強固となる。

20 前記突起をシール金具を接合する外被端部の外表面に軸方向に離間させて半径方向外側に突き出た少なくとも2個の突起とすることが好ましい。このようにすることによって、RTVが良好に突起間に保持され、より良好な接着が可能となる。

【0012】少なくとも外被の該RTV保持部に塗布するRTVとしては、室温硬化型シリコンゴムを用いることができる。また、芯筒端部の外周面及びシール金具の芯筒の挿入穴の少なくとも一方に塗布する樹脂としては、エポキシ樹脂を用いることができる。

30 【0013】樹脂を塗布した後、芯筒端部及び外被端部とをシール金具の挿入穴に挿入して、該樹脂を硬化させる。また、シール金具には、芯筒の端部を挿入する穴部及び外被の端部を挿入する穴部からなる2段の挿入穴を設けることが好ましく、挿入の際、芯筒の端部を芯筒端部挿入穴部の底部に密着させることが好ましい。硬化させる際には、複合導管全体を加熱炉に入れRTV、樹脂を加熱硬化させ、芯筒端部の外周面及び外被の端部とシール金具とを接着・接合し、芯筒の端部の外周部とシール金具との接着・接合部にガス・絶縁油に対しシール性を付与し、シール金具と外被の端部との接着・接合部に水密性を付与する。

【0014】

【実施例】以下に、本発明の実施例について述べる。図3において、本発明の複合導管及び複合導管の製造方法を加圧ガス（絶縁油）タイプの複合導管に用いた例を示す。図中、1はFRPからなる芯筒、2は芯筒の外周に形成したEDPMからなる外被、3は芯筒の端部及び外被の端部に取り付けたアルミ合金からなるフランジ金具、4は芯筒の端部及び外被の端部を挿入する挿入穴である。外被の端部には2個の環状の突起9が、半径方向

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外側に突き出ている。挿入孔4は、芯筒の端部を挿入する孔4-1及び外被の端部を挿入する穴4-2からなる。該突起の外径D、シール金具の外被端部の挿入穴の径d、芯筒の端部の外径d1、シール金具の芯筒の挿入穴の径d2は以下の通り設定されている。

$$D = 120 \text{ mm}, \quad d = 118 \text{ mm}$$

$$d1 = 105 \text{ mm}, \quad d2 = 105 \text{ mm}$$

【0015】室温硬化型シリコンゴムを2個の環状突起9の間のRTV保持部および環状突起9の周囲に塗布し、またエポキシ樹脂を薄く塗り、芯筒の端部及び外被の端部をフランジ金具の挿入穴4-1、4-2に挿入する。次に、加熱炉にこのように組み立てた複合導管を設置し、所望の加熱温度、所望の加熱時間でシリコンゴム及びエポキシ樹脂を硬化させ、シール金具を芯筒端部の外周面及び外被の端部に接着・接合した。これにより、シール金具と芯筒の外周面との接着・接合部はガス・絶縁油に対しシール性を有し、シール金具と外被の端部との接着・接合部は水密性を付与できる。

【0016】

【発明の効果】本発明の複合導管及び同複合導管は製造方法は、中空の芯筒と、芯筒の外周に設けた外被と、芯筒の端部に取り付けられ芯筒端部の外周面及び外被の端部に接着・接合したシール金具とからなりシール金具と

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芯筒の外周面との接着・接合部にガス・絶縁油に対しシール性を持たせ、シール金具と外被の端部との接着・接合部に水密性を持たせることができるので、複合導管に水密性及び加圧ガス及び絶縁油へのシール性を付与することができる。それによって、複合導管の内部の絶縁性を良好に保ち、耐久性に優れた複合導管が提供できる。

【図面の簡単な説明】

【図1】従来の複合導管の端部近傍を示す断面図である。

【図2】従来のアレスター用の複合導管の端部近傍を示す断面図である。

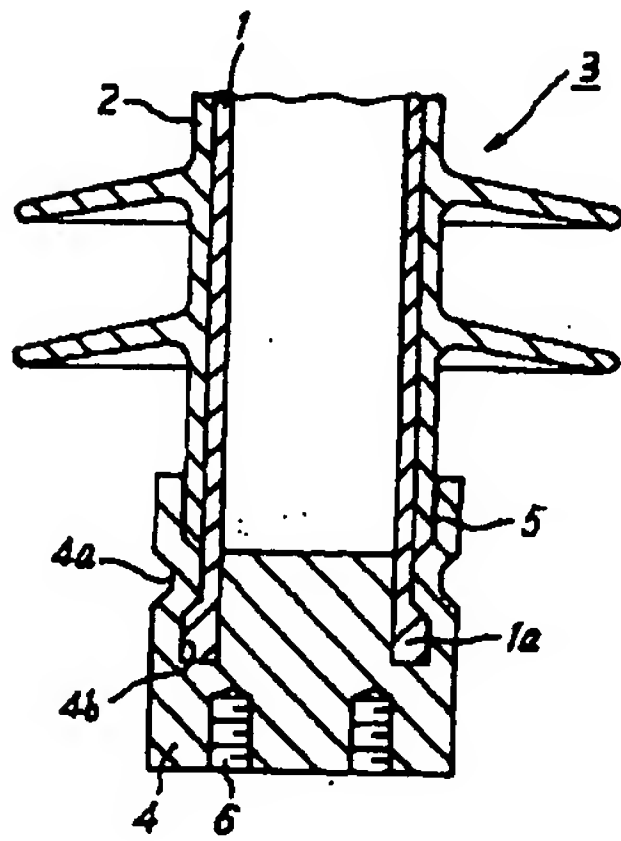
【図3】組付け前の本発明の複合導管の端部近傍を示す断面図である。

【図4】組付け後の本発明の複合導管の端部近傍を示す断面図である。

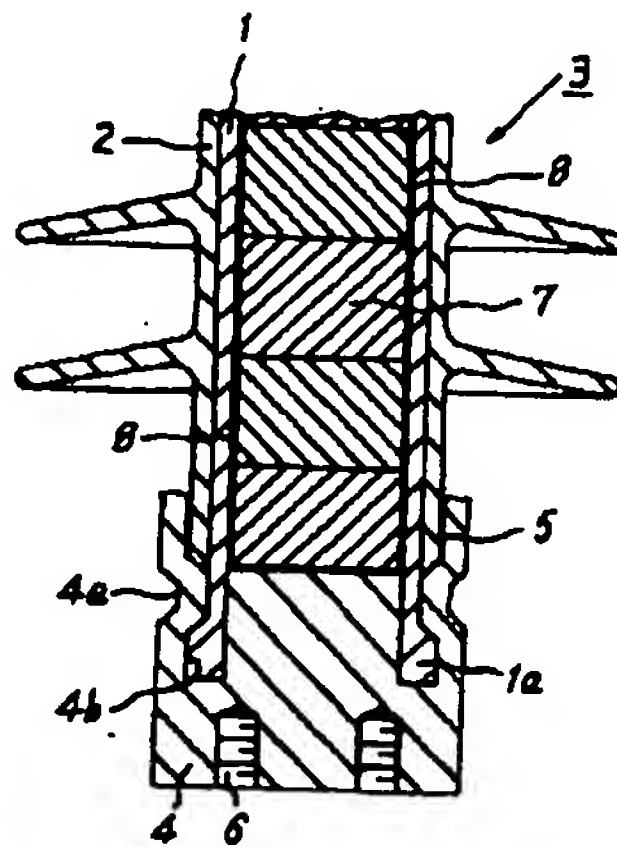
【符号の説明】

1 芯筒、1a 肉厚部、2 外被、3 複合導管本体、4 フランジ金具、4a かしめ部、4a 環状溝、4b、5 樹脂接着・接合部、6 ボルト穴、7 アレスター、8 ライニング部、9 環状の突起、10 フランジ金具と外被との接着・接合部、11 フランジ金具と芯筒との接着・接合部

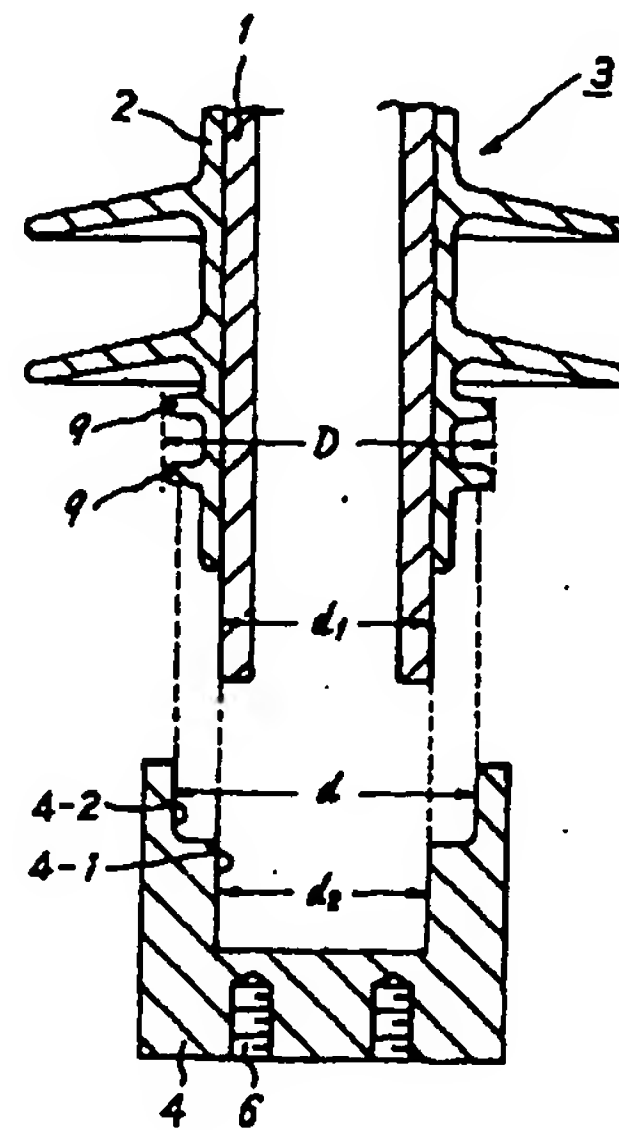
【図1】



【図2】



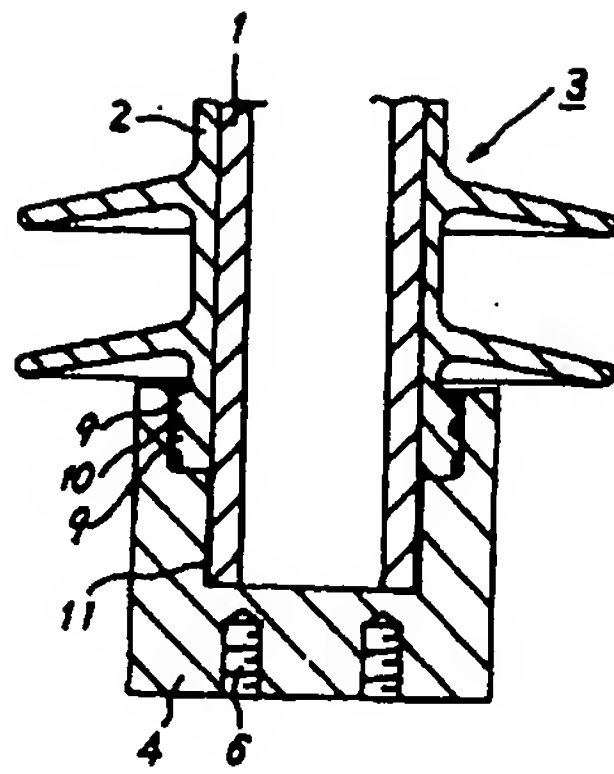
【図3】



(5)

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【図4】



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a compound porcelain tube. Or a "porcelain tube" is used for a bushing body part, it is an insulating member for containing elements, such as a lightning rod component, or it lets a conductor pass inside shaft orientations, it means what has a through tube for containing an element here, and a bushing means the equipment which insulates and supports a conductor from a septum, when letting a wall or a conductor pass. Moreover, a "compound porcelain tube" means the porcelain tube which consists of housing which consists of a core cylinder in the air and insulating polymeric materials prepared in the periphery section, and flange metallic ornaments.

[0002]

[Description of the Prior Art] Conventionally, the compound porcelain tube equipped with flange metallic ornaments as shown in drawing 1 is known. Namely, it inserts in circular-sulcus 4b which formed in the edge the edge of the body 3 of a compound porcelain tube which formed the jacket 2 in the surroundings of the peripheral face of the hollow core cylinder 1 which has thick section 1a in this compound porcelain tube at the flange metallic ornaments 4. While pasting up between the peripheral face of a jacket edge, and the inner skin which flange metallic ornaments counter watertight in the location shown by five in drawing with low-temperature vulcanization silicone rubber (referred to as "RTV" below) Flange metallic ornaments were attached in the edge of the body 3 of a compound porcelain tube which formed the jacket 2 in the peripheral face of the hollow core cylinder 1 by reducing the diameter of partial 4a of the flange metallic ornaments of the method of the outside of shaft orientations of this jointing from a periphery, and closing to the surroundings of a core cylinder. Six in drawing is a bolthole which attaches a flange in other members.

[0003]

[Problem(s) to be Solved by the Invention] In the case of the above-mentioned compound porcelain tube, the internal and external watertightness of a compound porcelain tube was secured by the adhesion and the joint by RTV between the peripheral face of a jacket edge, and the inner skin to which flange metallic ornaments correspond, but since the mutual member had only touched, the caulking section was not able to ask this part for airtightness. For this reason, when using the above-mentioned compound porcelain tube as a stowage container of an arrester (refer to drawing 2), the space between an internal element and a hollow core cylinder was made full of an elastic insulator like RTV which carried out restoration postcure. Airtightness did not become trouble practically by such usage.

[0004] However, although invasion of the water from the outside could be prevented in the RTV layer which pastes up between the peripheral face of a jacket edge, and the inner skin which flange metallic ornaments counter watertight when pressurization gas and insulating oil were enclosed with the interior of the compound porcelain tube shown in drawing 1, in this RTV layer, leakage of pressurization gas or insulating oil was not fully able to be prevented. This invention offers the manufacture approach of a compound porcelain tube with pressurization gas or an oil able to prevent that the moisture of leakage or the open air invades between the inside and outside of a compound porcelain tube, and this compound

porcelain tube while preventing that water, such as storm sewage to the interior from the outside, invades.

[0005]

[Means for Solving the Problem] The compound porcelain tube of this invention consists of a core cylinder in the air, a jacket prepared in the periphery of a core cylinder, and a seal metal which it was attached in the edge of a core cylinder, and was pasted up and joined at the peripheral face of a core cylinder edge, and the edge of a jacket. It is characterized by preparing the projection which projected on the radial outside in the outside surface of the jacket edge which joins a seal metal, for adhesion and the joint of a seal metal and the peripheral face of a core cylinder having seal nature to gas and insulating oil, and adhesion and the joint of a seal metal and the edge of a jacket having watertightness.

[0006] It consists of a jacket which formed the manufacture approach of the compound porcelain tube of this invention in the periphery of a core cylinder in the air and a core cylinder, and a seal metal pasted up and joined at the peripheral face of a core cylinder edge, and the edge of a jacket by being attached in the edge of a core cylinder, and adhesion and the joint of a seal metal and the peripheral face of a core cylinder has seal nature to gas and insulating oil, and adhesion and the joint of a seal metal and the edge of a jacket is the manufacture approaches of a compound porcelain tube of having watertightness, and has the following descriptions.

[0007] (1) Form a jacket in the surroundings of the periphery of a core cylinder, prepare the projection which projected on the radial outside in the outside surface of the jacket which pastes up and joins a seal metal, and use the end face section of this projection as an attaching part for securing watertightness.

(2) Apply RTV (low-temperature vulcanization silicone rubber) to this resin attaching part of a jacket at least, and apply resin to at least the peripheral face of a core cylinder edge, or the insertion hole of the core cylinder of a seal metal either.

(3) Following on a process (2), insert a jacket edge and a core cylinder edge in the insertion hole of a seal metal, and stiffen this RTV and resin.

[0008] The compound porcelain tube and this compound porcelain tube of this invention the manufacture approach Consist of a core cylinder in the air, a jacket prepared in the periphery of a core cylinder, and a seal metal pasted up and joined at the peripheral face of a core cylinder edge, and the edge of a jacket by being attached in the edge of a core cylinder, and seal nature is given to adhesion and the joint of a seal metal and the peripheral face of a core cylinder to gas and insulating oil. Since watertightness can be given to adhesion and the joint of a seal metal and the edge of a jacket, watertightness, pressurization gas, and the seal nature to insulating oil can be demonstrated to a compound porcelain tube.

[0009]

[Embodiment of the Invention] The manufacture approach of the compound porcelain tube of this invention and this compound porcelain tube is described below. As for the compound porcelain tube of this invention, it is desirable that said projection is substantially prolonged to the opposed face of the seal metal pasted up and joined at the jacket edge. The case of being in contact with the opposed face of the seal metal with which the edge of the projection "being prolonged substantially" here is pasted up and joined by the jacket edge, and the case of the opposed face of the seal metal, with which the edge of a projection is pasted up and joined by the jacket edge where it extends to near very much are meant. In this case, since the amount of RTV(s) of a complement can be certainly held to the adhesion and junction to a jacket edge and a seal metal in the resin attaching part formed in the end face section of a projection, and its near in case a compound porcelain tube is manufactured, junction and adhesion with the jacket edge of a compound porcelain tube and a seal metal become firmer. Moreover, it is desirable to prepare two steps of insertion holes which consist of holes which insert in a seal metal the hole which inserts the edge of a core cylinder, and the edge of a jacket, and it is desirable in this case to stick the edge of a core cylinder at the pars basilaris ossis occipitalis of a core cylinder edge insertion hole.

[0010] The compound porcelain tube of this invention is below an outline, and can be made and manufactured. Although a jacket is formed in the surroundings of the periphery of a core cylinder, the conventional approach of the injection fabricating method, the transfer-molding method, or the

compression fabricating method can be used for formation of a jacket. The projection which projected on the radial outside using the end face section as an attaching part of RTV can be formed in above-mentioned one in a forming cycle. Moreover, it can form in formation and coincidence of the above-mentioned jacket also about at least two projections which the outside surface of the jacket which pastes up and joins a seal metal was made to estrange to shaft orientations, and projected on the radial outside. Under the present circumstances, even if this ** cannot be found, a RTV attaching part is formed between two adjoining projections.

[0011] It is desirable to be referred to as $D > d$ and $d_1 - d_2 \leq 0$ in the condition before attaching a seal metal in the end face of a core cylinder, the peripheral face of a core cylinder edge, and an envelope edge. D is the outer diameter of this ***** here, d is the path of the insertion hole of the jacket edge of a seal metal, d_1 is the outer diameter of the edge of a core cylinder, and d_2 is the path of the insertion hole of the core cylinder edge of a seal metal. As mentioned above, since the amount of RTV(s) required for the adhesion and junction to a seal metal can be certainly held by doing in this way to the RTV attaching part formed between projections, and its near, junction and adhesion with the jacket edge of a compound porcelain tube and a seal metal become firmer. It is desirable to consider as at least two projections which the outside surface of the jacket edge which joins a seal metal was made to estrange said projection to shaft orientations, and projected on the radial outside. By doing in this way, RTV is held between projections good and the better adhesion of it is attained.

[0012] As RTV applied to this RTV attaching part of a jacket at least, room-temperature-curing mold silicone rubber can be used. Moreover, an epoxy resin can be used as resin applied to either [at least] the peripheral face of a core cylinder edge, or the insertion hole of the core cylinder of a seal metal.

[0013] After applying resin, a core cylinder edge and a jacket edge are inserted in the insertion hole of a seal metal, and this resin is stiffened. Moreover, it is desirable to prepare two steps of insertion holes which consist of holes which insert in a seal metal the hole which inserts the edge of a core cylinder, and the edge of a jacket, and in case it is insertion, it is desirable to stick the edge of a core cylinder at the pars basilaris ossis occipitalis of a core cylinder edge insertion hole. In case it is made to harden, the whole compound porcelain tube is put into a heating furnace, heat hardening of RTV and the resin is carried out, the peripheral face of a core cylinder edge, and the edge and seal metal of a jacket are pasted up and joined, seal nature is given to adhesion and the joint of the periphery section of the edge of a core cylinder, and a seal metal to gas and insulating oil, and watertightness is given to adhesion and the joint of a seal metal and the edge of a jacket.

[0014]

[Example] Below, the example of this invention is described. In drawing 3 $R > 3$, the example which used the manufacture approach of the compound porcelain tube of this invention and a compound porcelain tube for the pressurization gas (insulating oil) type compound porcelain tube is shown. The core cylinder with which one consists of FRP, the jacket which consists of EDPM which formed 2 in the periphery of a core cylinder, the flange metallic ornaments which consist of an aluminum containing alloy which attached 3 in the edge of a core cylinder and the edge of a jacket, and 4 are insertion holes which insert the edge of a core cylinder, and the edge of a jacket among drawing. two annular projections 9 project on the radial outside, and come out and are in the edge of a jacket on it. The insertion hole 4 consists of a hole 4-2 which inserts the edge of the hole 4-1 which inserts the edge of a core cylinder, and a jacket. The outer diameter D of this projection, the path d of the insertion hole of the jacket edge of a seal metal, the outer diameter d_1 of the edge of a core cylinder, and the path d_2 of the insertion hole of the core cylinder of a seal metal get with following one, and are set up.

$D = 120\text{mm}$ $d_1 = 105\text{mm}$ of $= 118\text{mm}$ $d_2 = 105\text{mm}$ [0015] Room-temperature-curing mold silicone rubber is applied to the RTV attaching part between two annular projections 9, and the perimeter of the annular projection 9, and an epoxy resin is applied thinly, and the edge of a core cylinder and the edge of a jacket are inserted in the insertion hole 4-1 of flange metallic ornaments, and 4-2. Next, the compound porcelain tube assembled in this way to the heating furnace was installed, whenever [desired stoving temperature], by desired heating time, silicone rubber and an epoxy resin were stiffened, and the seal metal was pasted up and joined at the peripheral face of a core cylinder edge, and the edge of a jacket.

Thereby, adhesion and the joint of a seal metal and the peripheral face of a core cylinder have seal nature to gas and insulating oil, and adhesion and the joint of a seal metal and the edge of a jacket can give watertightness.

[0016]

[Effect of the Invention] The compound porcelain tube and this compound porcelain tube of this invention the manufacture approach Consist of a core cylinder in the air, a jacket prepared in the periphery of a core cylinder, and a seal metal pasted up and joined at the peripheral face of a core cylinder edge, and the edge of a jacket by being attached in the edge of a core cylinder, and seal nature is given to adhesion and the joint of a seal metal and the peripheral face of a core cylinder to gas and insulating oil. Since watertightness can be given to adhesion and the joint of a seal metal and the edge of a jacket, watertightness, pressurization gas, and the seal nature to insulating oil can be given to a compound porcelain tube. By it, the insulation inside a compound porcelain tube is kept good, and the compound porcelain tube excellent in endurance can be offered.

[Translation done.]

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CLAIMS

[Claim(s)]

[Claim 1] It consists of a core cylinder in the air, a jacket prepared in the periphery of a core cylinder, and a seal metal which it was attached in the edge of a core cylinder, and was pasted up and joined at the peripheral face of a core cylinder edge, and the edge of a jacket. It is the compound porcelain tube with which the projection which projected on the radial outside is prepared in the outside surface of the jacket edge which joins a seal metal, adhesion and the joint of a seal metal and the peripheral face of a core cylinder have seal nature to gas and insulating oil, and adhesion and the joint of a seal metal and the edge of a jacket have watertightness.

[Claim 2] The compound porcelain tube according to claim 1 characterized by having prolonged said projection substantially to the opposed face of the seal metal pasted up and joined at the jacket edge.

[Claim 3] The compound insulator according to claim 1 or 2 characterized by being at least two projections to which said projection made the outside surface of the jacket edge which pastes up and joins a seal metal estrange to shaft orientations, and projected on the radial outside.

[Claim 4] It is the manufacture approach of a compound porcelain tube of consisting of a core cylinder in the air, a jacket prepared in the periphery of a core cylinder, and a seal metal pasted up and joined at the peripheral face of a core cylinder edge, and the edge of a jacket by being attached in the edge of a core cylinder, and adhesion and the joint of a seal metal and the peripheral face of a core cylinder having seal nature to gas and insulating oil, and adhesion and the joint of a seal metal and the edge of a jacket being the manufacture approaches of a compound porcelain tube of having watertightness, and having the following descriptions.

(1) Form a jacket in the surroundings of the periphery of a core cylinder, prepare the projection which projected on the radial outside in the outside surface of the jacket which joins a seal metal, and use the end face section of a projection as an attaching part of RTV (low-temperature vulcanization silicone rubber) for securing watertightness.

(2) Apply RTV to this RTV attaching part of a jacket at least, and apply the resin for giving seal nature to either [at least] the peripheral face of a core cylinder edge, or the insertion hole of the core cylinder of a seal metal, and joining to it.

(3) Following on a process (2), insert a jacket edge and a core cylinder edge in the insertion hole of a seal metal, and stiffen this RTV and this resin.

[Claim 5] The manufacture approach of the compound porcelain tube according to claim 4 characterized by being referred to as $D > d$ and $d1 - d2 \leq 0$ (D being the outer diameter of this *****, d being the path of the insertion hole of the jacket edge of a seal metal, $d1$ being the outer diameter of the edge of a core cylinder, and $d2$ being the path of the insertion hole of the core cylinder of a seal metal) in the condition before attaching a seal metal in the end face of a core cylinder, the peripheral face of a core cylinder edge, and an envelope edge.

[Claim 6] The compound insulator according to claim 4 or 5 characterized by being at least two projections to which said projection made the outside surface of the jacket edge which pastes up and joins a seal metal estrange to shaft orientations, and projected on the radial outside.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view in which it is shown near the edge of the conventional compound porcelain tube.

[Drawing 2] It is the sectional view in which it is shown near the edge of the compound porcelain tube for the conventional arresters.

[Drawing 3] It is the sectional view in which it is shown near the edge of the compound porcelain tube of this invention before attachment.

[Drawing 4] It is the sectional view in which it is shown near the edge of the compound porcelain tube of this invention after assembly.

[Description of Notations]

1 Core Cylinder, 1a Thick Section, 2 Jacket, 3 Body of Compound Porcelain Tube, 4 Flange Metallic Ornaments, 4a Caulking Section, 4a Circular Sulci 4B and 5 Resin Adhesion and Joint, 6 Boltholes, 7 Arrester, 8 Lining Section, 9 Annular Projection, 10 Adhesion and Joint of Flange Metallic Ornaments and Jacket, 11 Adhesion and Joint of Flange Metallic Ornaments and Core Cylinder

[Translation done.]

